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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/601,151	06/20/2003	Achintya K. Bhowmik	ITL.0982US (P16217)	7131
7590	01/28/2005		EXAMINER	
Timothy N. Trop TROP, PRUNER & HU, P.C. STE. 100 8554 KATY FWY HOUSTON, TX 77024-1841			LEPISTO, RYAN A	
			ART UNIT	PAPER NUMBER
			2883	
DATE MAILED: 01/28/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

Office Action Summary

Application No.

10/601,151

Applicant(s)

BHOWMIK ET AL.

Examiner

Ryan Lepisto

Art Unit

2883

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2003.
 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) ☐ Claim(s) _____ is/are allowed.
 6) ☒ Claim(s) 1-4, 6-8, 10-22 and 24-35 is/are rejected.
 7) ☒ Claim(s) 5, 9, 18 and 23 is/are objected to.
 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
 10) ☒ The drawing(s) filed on 20 June 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date _____.
 4) ☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date _____.
 5) ☐ Notice of Informal Patent Application (PTO-152)
 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 15b.
2. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1-2, 6, 8, 10, 12 and 14** are rejected under 35 U.S.C. 102(b) as being anticipated by **Li (US 5,881,199)**. Li teaches a method and apparatus comprising of and forming an arrayed waveguide grating dense wavelength division multiplexer

(DWDM) (Fig. 1-2) on a planar light circuit (column 4 lines 52-55) including input waveguides (14), waveguide array grating (AWG) (22) an output slab waveguide (free space region 18) coupled to a pair of output waveguides (24) coupled to a directional coupler (Fig. 2, 28), where the directional coupler (28) is coupled to the output slab waveguide (22) via output waveguides (24) (column 4 lines 25-34 and column 5 lines 12-16).

4. **Claims 8, 11, 17, 29-30 and 33-34** are rejected under 35 U.S.C. 102(b) as being anticipated by **Doerr et al (US 6,236,781 B1)** (Doerr). Doerr teaches a method and an AWG apparatus (Fig. 3) comprising a waveguide array (306), an output slab waveguide (free space region 308) coupled to first and second output waveguides (310₁, 310₂) coupled to multi-mode interference (MMI) coupler (312) (column 3 lines 64-65) where the MMI coupler (312) is coupled to the slab waveguide (308) via waveguides (310₁, 310₂) and where a third and fourth output waveguide is coupled to another MMI coupler (not shown, claim 6) for filtering a signal using the AWG (column 4 lines 66-67 through column 5 lines 1-6) and adjusting (in this case reducing) the spacing between successive waveguides to generate a flat spectral output wave form (column 4 lines 5-13).

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 1-2, 6, 8, 10 and 13-14** are rejected under 35 U.S.C. 102(e) as being anticipated by **Nishimura et al (US 6,507,680 B1)** (Nishimura). Nishimura teaches an arrayed waveguide grating demultiplexer (Fig. 9, column 9 lines 32-42) on planar light circuit substrate (1) comprising an input (2) and output waveguide (13), a waveguide array (21), an output slab waveguide (22) coupled to the array (21) and output waveguides (13) and a directional coupler (3) coupled to at least two output waveguides (13) and to the slab waveguide (22).

6. **Claims 22 and 28** are rejected under 35 U.S.C. 102(e) as being anticipated by **He (WO 03/05086 A1)**. He teaches an optical filter (Fig. 2A-B) comprising an input and output waveguide coupler (abstract), a waveguide pair (3 pairs shown in Fig. 2B) coupled to the output waveguide coupler where the waveguide pair have a length difference such that a flat spectral output signal is produce (abstract).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. **Claims 19-21** are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Doerr, Nishimura and Li.

Doerr teaches the AWG with the limitation described above used to reject claims 17, 29-30 and 33-34.

Doerr does not teach expressly that the AWG is formed on a planar light circuit or is a multiplexer/demultiplexer.

Nishimura and Li teach AWGs as described above wherein the AWG as taught by Li is almost identical to the structure as taught by Doerr wherein Li teaches that the AWG is a multiplexer and formed on a planar light substrate. Nishimura teaches a AWG used as a demultiplexer.

Doerr, Nishimura and Li are analogous art because they are from the same field of endeavor, AWGs with slab waveguides, grating sections and input/output waveguides.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art that the AWG as taught by Doerr are used as either multiplexers or demultiplexers and are formed on planar optical substrates as is taught in Nishimura and Li.

The motivation for doing so would have been to increase durability of the AWG by supporting the structure via a substrate and the increase uses of the AWG by using it to either multiplex or demultiplex optical signals.

8. **Claims 24-27** are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of He, Nishimura and Li.

He teaches the AWG with the limitation described above used to reject claims 22 and 28

He does not teach expressly that the AWG is formed on a planar light circuit, waveguide pairs coupled to a directional coupler or is a multiplexer/demultiplexer.

Nishimura and Li teach AWGs as described above wherein Li teaches that the AWG is a multiplexer and formed on a planar light substrate with waveguide pairs coupled by directional couplers. Nishimura teaches a AWG used as a demultiplexer.

He, Nishimura and Li are analogous art because they are from the same field of endeavor, AWGs with slab waveguides, grating sections and input/output waveguides.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art that the AWG as taught by Doerr are used as either multiplexers or demultiplexers and are formed on planar optical substrates as is taught in Nishimura and Li. It would also have been obvious to a person of ordinary skill in the art that directional couplers were widely used in such systems to ensure proper coupling as taught by Li

The motivation for doing so would have been to increase durability of the AWG by supporting the structure via a substrate and the increase uses of the AWG by using it to either multiplex or demultiplex optical signals and to increase coupling efficiency.

9. **Claims 3-4 and 15-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Li and Doerr.

Li teaches the AWG with the limitations described above used to reject claims 1-2, 6, 8, 10, 12 and 14.

Li does not teach expressly that the channel spacing between the coupling pairs is different/greater than the channel difference between the two waveguides in each pair.

Doerr teaches adjusting (in this case reducing) the spacing between successive waveguides to generate a flat spectral output waveform (column 4 lines 5-13).

Li and Doerr are analogous art because they are from the same field of endeavor, AWGs with slab waveguides, grating sections and input/output waveguides.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art as it was an ordinary practice in the art to adjust channel spacing in AWG waveguides to achieve flat spectral outputs as is taught by Doerr

The motivation for doing so would have been to increase efficiency and an integrity of the optical signal by eliminating excess loss by ensuring the signal is not radiated out or lost (Doerr, column 2 lines 15-19).

10. **Claims 31-32 and 35** are rejected under 35 U.S.C. 103(a) as being unpatentable over Doerr.

Doerr teaches the AWG with the limitations described above used to reject claims 8, 11, 17, 29-30 and 33-34.

Doerr does not teach expressly that the channel spacing between the coupling pairs is greater than the channel difference between the two waveguides in each pair.

Doerr does teach adjusting (in this case reducing) the spacing between successive waveguides to generate a flat spectral output waveform (column 4 lines 5-13).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art as it was an ordinary practice in the art to adjust channel spacing in AWG waveguides to achieve flat spectral outputs as is taught by Doerr

The motivation for doing so would have been to increase efficiency and an integrity of the optical signal by eliminating excess loss by ensuring the signal is not radiated out or lost (Doerr, column 2 lines 15-19).

Allowable Subject Matter

11. **Claims 5, 9, 18 and 23** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

These claims would be allowable over the prior art of record if rewritten in independent form including all of the limitations of the base claim and any intervening claims because the latter, either alone or in combination, does not disclose nor render obvious the length difference of waveguide pairs being approximated by the equation of claims 5, 9, 18 and 23, in combination with the rest of the claimed limitations.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

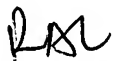
- Chen (US 6,205,273 B2) teaches an AWG with different sized output waveguides that might change the channel spacing.
- Hosoi (US 2002/0001433 A1) teaches an AWG with different channel spacing for individual waveguides.
- Tabuchi et al (US 2004/0151432 A1) teaches an AWG with different waveguide lengths to create a flat spectrum.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan Lepisto whose telephone number is (571) 272-1946. The examiner can normally be reached on M-F 7:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ryan Lepisto

Art Unit 2883

Date: 1/12/05



Frank Font

Supervisory Patent Examiner

Technology Center 2800